

WHAT IS CLAIMED IS:

1. A system for providing a gain to be generated by a gain control device located in at least one signal path of the system, the system comprising:
 - at least one echo canceller device in the signal path;
 - at least one gain control device in the signal path;
 - at least one connection between the echo canceller device and the gain control device,wherein information pertaining to the signal is provided from the echo canceller device to the gain control device so that the gain can be maximized in light of the information.
2. The system of Claim 1, wherein the information includes statistical performance information from echo canceller device.
3. The system of Claim 2, wherein the statistical performance information includes at least a loss estimate.
4. The system of Claim 3, wherein the loss estimate includes at least an echo return loss component and an echo return loss enhancement component.
5. The system of Claim 1, wherein the connection between the echo canceller and the gain control is a feedforward connection.
6. The system of Claim 1, wherein the signal path includes at least one ingress signal path having an ingress echo canceller and ingress gain control with an information connection therebetween, and at least one egress signal path having an egress echo canceller and egress automatic gain control with an information connection therebetween.
7. The system of Claim 6, wherein the information connection between the ingress echo canceller and the ingress gain control is a feedforward connection, and the information connection between the egress echo canceller and the egress gain control is a feedforward connection.

8. A method for providing a gain to be generated by a gain control device located in at least one signal path of the system, the method comprising the steps of:

receiving a signal with an echo canceller device in the signal path;

generating echo canceller performance information; and

sending the performance information to a gain control device in the signal path, wherein the performance information is used to generate a gain limit that is maximized in light of the information.

9. The method of Claim 8, wherein the step of generating echo performance information includes generating at least an echo return loss portion and an echo return loss enhancement portion.

10. The method of Claim 9, wherein the step of generating echo performance information includes summing the echo return loss portion and the echo return loss enhancement portion in dB to form a combined loss rate.

11. The method of Claim 10, wherein the step of generating the echo performance information includes utilizing a peak power estimator to provide the peak power for the tail end of a block of samples.

12. The method of Claim 11, wherein the step of generating the echo performance information includes utilizing a window power estimator to provide power estimate over a sliding area of a certain number of previous blocks and a certain number of current blocks.

13. The method of Claim 9, wherein the step of generating echo performance information includes utilizing a near end detector, and setting the detector to a certain time period if certain conditions are satisfied, including:

the far end window power being greater than a set level;

the near end window power being greater than the peak power of the far end; and

the window power after the echo canceller to be within a certain amount of the window power before the echo canceller.

14. The method of Claim 13, wherein the near end detector is set to around 250 msec.

15. The method of Claim 13, wherein the set level is around -36 dBm, and the certain amount is around 3 dB.

16. The method of Claim 13, wherein if any of the conditions are not satisfied, then hangover counter is set to a maximum value if a tonal signal is detected on the egress path, and decremented otherwise if greater than zero.

17. The method of Claim 9, wherein the ERL estimate includes the steps of:
determining a long term ERL level;
determining a short term ERL estimate;
determining a first long term ERL estimate ERL_{lt} ;
determining a second long term ERL estimate ERL_c ; and
denoting the ERL estimate as the larger of ERL_{lt} and ERL_c .

18. The method of Claim 17, wherein the first long term ERL estimate is equal to the shorter term ERL estimate filtered through a first order infinite impulse response filter having a certain coefficient.

19. The method of Claim 17, wherein the ERLE estimate includes the steps of:
determining a long term ERLE level;
determining a short term ERLE estimate;
determining a first long term ERLE estimate $ERLE_{lt}$;
determining a second long term ERLE estimate $ERLE_c$; and
denoting the estimated ERLE as the longer of $ERLE_{lt}$ and $ERLE_c$.

20. The method of Claim 19, wherein the first long term ERLE estimate is equal to the shorter term ERLE estimate filtered through a first order infinite impulse response filter having a certain coefficient.

21. The method of Claim 10, wherein a maximum gain is determined by the steps of:
subtracting an offset from the combined loss rate to form a gain quantity;
determining a maximum gain that will still provide stability for the system;
setting the gain control device gain to the lesser of gain quantity and the maximum gain.

22. The method of Claim 21, wherein the offset is approximately 6 dB, and the maximum gain is approximately 24 dB.

23. A method of generating an echo return loss (ERL) estimate for a communication signal, the method comprising:

determining an ERL value;
determining an ERL_c value; and
denoting the ERL estimate as a function of the ERL value and the ERL_c value.

24. A method of generating an echo return loss enhancement (ERLE) estimate for a communication signal, the method comprising:

determining a first long term ERLE value ERLE_{lt};
determining a second long term ERLE value ERLE'_{lt}; and
denoting the ERLE estimate as a function of the ERLE_{lt} and the ERLE'_{lt} values.

25. A method of generating an echo return loss enhancement (ERL) estimate for a communication signal, the method comprising:

determining a first long term ERL value ERL_{lt};
determining a second long term ERL value ERL'_{lt}; and
denoting the ERL estimate as a function of the ERL_{lt} and the ERL'_{lt} values.